3GPP TSG RAN Meeting #71
Göteborg, Sweden, March 7-10, 2016

RP-160681~~309~~

Source: Huawei, China Unicom, China Telecom, HiSilicon
Title: New Study Item proposal: LTE bandwidth flexibility enhancements
Document for: Approval
Agenda Item: 10.1.4

3GPP™ Work Item Description

For guidance, see 3GPP Working Procedures, article 39; and 3GPP TR 21.900.
Comprehensive instructions can be found at http://www.3gpp.org/Work-Items

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Title: LTE bandwidth flexibility enhancements

Acronym: LTE_BW_Flex

Unique identifier:

NOTE: If this is a RAN WID including Core and Perf. part, then Title, Acronym and Unique identifier refer to the feature WI. Please tick (X) the applicable box(es) in the table below:

This WID includes a Core part	X
This WID includes a Performance part	X

1 3GPP Work Area

X	**Radio Access**
	Core Network
	Services

2 Classification of WI and linked work items

2.0 Primary classification

This work item is a …

X	**Study Item (go to 2.1)**
	Feature (go to 2.2)
	Building Block (go to 2.3)
	Work Task (go to 2.4)

NOTE: Core, Performance and Testing parts of RAN WIs are usually Building Blocks. If you are in doubt, please contact MCC.

2.1 Study Item

Related Work Item(s) (if any]		
Unique ID	**Title**	**Nature of relationship**

Go to §3.

2.2 Feature

Related Study Item or Feature (if any)		
Unique ID	**Title**	**Nature of relationship**

Go to §3.

2.3 Building Block

Parent Feature (or Study Item)		
Unique ID	**Title**	**TS**

This work item is …

	Stage 1 (go to 2.3.1)
	Stage 2 (go to 2.3.2)
	Stage 3 (go to 2.3.3)
	Test spec (go to 2.3.4)
	Other (go to 2.3.5)

2.3.1 Stage 1

Source of external requirements (if any)		
Organization	**Document**	**Remarks**

Go to §3.

2.3.2 Stage 2

Corresponding stage 1 work item		
Unique ID	**Title**	**TS**

Other source of stage 1 information		
TS or CR(s)	**Clause**	**Remarks**

If no identified source of stage 1 information, justify:

Go to §3.

2.3.3 Stage 3

Corresponding stage 2 work item (if any)		
Unique ID	**Title**	**TS**

Else, corresponding stage 1 work item		
Unique ID	**Title**	**TS**

Other justification		
TS or CR(s) or external document	**Clause**	**Remarks**

If no identified source of stage 2 information, justify:

Go to §3.

2.3.4 Test spec

Related Work Item(s)		
Unique ID	**Title**	**TS**

Go to §3.

2.3.5 Other

Related Work Item(s)			
Unique ID	**Title**	**Nature of relationship**	**TS / TR**

Go to §3.

2.4 Work task

Parent Building Block		
Unique ID	**Title**	**TS**

3 Justification

Portions of the spectrum identified for IMT-advanced are under-utilized because in certain countries the channelization plan results in spectrum blocks allocated to an operator that do not exactly correspond to the specified nominal LTE bandwidth sizes supported since Rel-8 (1.4/3/5/10/15/20 MHz). Such cases may also arise when spectrum is displaced/re-farmed from GSM or UMTS to LTE within one operator’s licensed spectrum.

Spectrum allocations across the world show a large variety of non-standard spectrum block sizes (e.g. 1.8, 2.0, 2.2, 4.4, 4.6, 6, 6.2, 7.8, 7.0, 8.0, 11, 14, 18, 19 MHz), which makes it difficult for 3GPP to address this problem by defining new standardized nominal LTE bandwidth sizes. Furthermore, the alternative to utilize carrier aggregation within a non-standard block sizes would still not fully utilize the spectrum, and it would require the addition of many new band combinations.

Therefore, in order to increase the spectrum utilization in these spectrum blocks, there is a need to define a generic radio framework that maximizes the spectrum utilization under a known but arbitrary spectrum block size larger than 1.4 MHz and smaller than 20 MHz. Taking into account past studies on similar aspects (New Carrier Type discussion on extension carrier and carrier segment), the solution should have minimal (possibly no) impact to the UE RF whereas the base station could use a different bandwidth than 1.4/3/5/10/15/20 MHz. This Study Item proposes to evaluate the feasibility of utilizing the operator's spectrum asset as much as possible with limited impact on hardware implementation, in particular for UE, and RAN4 specifications.

4 Objective

4.1 Objective of SI or Core part WI or Testing part WI

This study item is to investigate the effectiveness of different proposals that are aimed to support bandwidth flexibility with limited impact on hardware implementation and RAN4 specifications, under the following assumptions:

(1) The eNB operates in the entire N MHz block (1.4 < N < 20).

(2) The UE operates in legacy channel bandwidths and no new channel bandwidth will be introduced

The study item particularly covers the following aspects:

- Impact to BS/UE RF requirements together with implementation
- cell search performance for legacy UE

Based on the outcome of the above studies, the following specification-related work will be identified pending approval of the related Work Item:

1. Constraints to the LTE air interface design for bandwidth flexibility
2. Necessary change for RAN4 specifications

Note: In this SI, the impact on RAN4 will be investigated. The impact on RAN1/2 of the above is not studied in this SI.

4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance part.

4.3 RAN time budget proposal

NOTE: For WIs/SIs under RAN WG5 leadership this section is not filled out. Otherwise:
For a not yet approved WI/SI the rapporteur has to fill out the last row of the table(s) below up to the target date of the WI/SI (if necessary add further tables): Indicate the number of time units (1 TU ~ 2h), i.e. one value for each session/field. If no time unit is needed, leave the field empty.
For WI/SI already approved in the past, the tables below will no longer be updated in the WI/SI description (i.e. the tables reflect the status of the initial approval). But changes can be proposed in the status report of the WI/SI.

RAN #71										**Q2/2016**								**RAN #72**	
R1L	R1U	R2L	R2U	R2J	R3	R4RF Core	R4RD Core	R4RF Perf	R4RD Perf	R1L	R1U	R2L	R2U	R2J	R3	R4RF Core	R4RD Core	R4RF Perf	R4RD Perf
84bis	84bis	93bis	93bis	93bis	91bis	78bis	78bis	78bis	78bis	85	85	94	94	94	92	79	79	79	79
						1	**0.5**	**0.5**		~~1~~						**0.5**	**0.5**		

RAN #72										**Q1/2016**								**RAN**	

#73									
R1L	R1U	R2L	R2U	R2J	R3	R4RF Core	R4RD Core	R4RF Perf	R4RD Perf
84	84	93	93	93	91	78	78	78	78

L: LTE, U: UMTS, J: Joint, RD: RRM/demodulation

NOTE: In case further explanation of the time budget proposal is needed, then please explain this below.

additional comments to the time budget proposal:

5 Service Aspects

6 MMI-Aspects

7 Charging Aspects

8 Security Aspects

9 Impacts

Affects:	**UICC apps**	**ME**	**AN**	**CN**	**Others**
Yes		X	X		
No				X	
Don't know					

10 Expected Output and Time scale

New specifications [If Study Item, one TR is anticipated]						
Spec No.	Title	1st rsp. WG	2nd rsp. WG(s)	Presented for information at plenary#	Approved at plenary #	Comments
TR 36.xxx	Study of LTE bandwidth flexibility enhancements				RAN#72 (June 2016)	

NOTE: If this is a RAN WID including Core and Perf. part, then all new Core part specs have to be listed first and then all new Perf. part specs. Indicate "Core part" or "Perf. part" under Comments for each spec.
By default a new specs can only be new for one of both parts.

Affected existing specifications [None in the case of Study Items]				
Spec No.	CR	Subject of the CR	Approved at plenary#	Comments

NOTE: If this is a RAN WID including Core and Perf. part, then all new Core part specs have to be listed first and then all new Perf. part specs. Indicate "Core part" or "Perf. part" under Comments for each spec.
If an existing spec is affected by both (Core part and Perf. part), then it has to be listed twice with appropriate approval dates.

11 Work item rapporteur(s)

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12 Work item leadership

Primary: RAN WG4
~~Secondary: RAN WG1~~

NOTE: If this is a RAN WID including Core and Perf. part, then this WG specifies the WG leading the Core part.
RAN WG4 is by default leading the Perf. part.

13 Supporting Individual Members

Supporting IM name
AT&T
Huawei
China Unicom
CATR
China Telecom
DISH NETWORKS
HiSilicon
IAESI
ITRI
LG Uplus
Ligado Networks
Rogers
TD-Tech
Telefonica
TELUS
US Cellular